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Indian Standard

METHODS OF TEST FOR
COATED AND TREATED FABRICS

PART I DETERMINATION OF ROLL CHARACTERISTICS

(*First Revision*)

UDC 677·865·2·064 : 677·017·2



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Indian Standard

METHODS OF TEST FOR COATED AND TREATED FABRICS

PART I DETERMINATION OF ROLL CHARACTERISTICS

(First Revision)

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Indian Standard

METHODS OF TEST FOR COATED AND TREATED FABRICS

PART I DETERMINATION OF ROLL CHARACTERISTICS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (Part I) (First Revision) was adopted by the Indian Standards Institution on 28 March 1982, after the draft finalized by the Treated Fabrics Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 This standard was published in 1973 and is being revised to incorporate the changes considered necessary as a result of experience gained in the implementation of this standard during this period.

0.3 Coated and treated fabrics are normally sold in the roll form. It, therefore, becomes essential to find out the correct length, width and thickness of the rolls of fabric before accepting the supply. Further, the mass per unit area of the coated and treated fabric, base fabric and of the coating are important requirements of contract for such fabrics. Determination of all these characteristics are collectively called the roll characteristics.

0.4 This standard is mainly based on ISO 2286-1972 'Fabrics coated with rubber or plastics — Determination of roll characteristics', issued by International Organization for Standardization.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (revised).

1. SCOPE

1.1 This standard (Part I) describes the methods for determining the length, width, net mass, mass per unit area, and thickness of rolls of coated and treated fabrics, with the exception of knitted type fabrics.

NOTE — It should be noted that the roll cannot normally be conditioned in a standard atmosphere and, therefore, the results may be influenced by variation of moisture due to changes in atmospheric conditions.

2. DETERMINATION OF THE LENGTH OF A ROLL

2.1 General Method

2.1.1 Apparatus — Flat table, not less than 5 m long, and at least as wide as the roll to be tested. Both longitudinal edges of the table should be marked off in 1 m lengths, at least one of these lengths being subdivided into 10 mm divisions.

2.1.2 Procedure — Trim the cut end of roll, if necessary, so that it is at right angles to the warp (longitudinal) direction of the roll, such trimming being confined to the minimum which is necessary to effect this. With the cut end of the roll aligned with the zero mark on the table, unroll the material along the table so that no tension is introduced. On reaching the limit of the table, mark the back of the roll by some suitable method on both edges to coincide with a known division of length. Reroll the portion that has been measured. Lay out, free from tension, a further portion of the unmeasured length and measure from the marked edges, as before. Repeat this process until the end of the roll is reached, trimming this, if necessary, as before. Measure the final length to the nearest 50 mm.

2.1.3 Expression of Results — Report the length of the roll, in metres, as the sum of all the readings, adjusted to the nearest 50 mm.

2.2 Drum Method

2.2.1 Procedure — Run the coated fabric over a measuring drum with just enough uniform tension to keep it running flat and true. Determine the length from the dial or counter on the drum. Report the length of the roll in metres, adjusted to the nearest 50 mm.

3. DETERMINATION OF THE WIDTH OF A ROLL

3.1 Apparatus

3.1.1 Flat Table — not less than 2 m long, and at least 50 mm wider than the width of the roll to be tested.

3.1.2 Steel Scale — length shall be greater than the width of the roll to be measured, graduated in centimetres and millimetres.

3.2 Procedure — Unroll the material along the table so that it is laid out smoothly without tension in either direction. In case of fabrics coated on one side, the coated side shall be kept upwards. Record to the nearest 5 mm at least five different measurements of width uniformly distributed along the full length of the roll or piece.

3.3 Expression of Results — Calculate the mean of the recorded widths adjusted to nearest 5 mm and report the value obtained as the average usable width. Report also the minimum usable width recorded.

4. DETERMINATION OF THE NET MASS AND MASS PER UNIT AREA OF ROLL OR SAMPLE

4.1 Determination of the Net Mass and Mass Per Unit Area of a Roll

4.1.1 Apparatus — Weighing device, with a calibrated scale, accurate at full scale deflection to 0.10 percent.

4.1.2 Procedure — Place the roll of material centrally on the pan or other supporting arrangement of the weighing device. Ensure that the roll and its support are free of contact with other bodies. Determine and record the gross mass. Determine and record the mass of the tube or former upon which the material has been rolled, and deduct this from the gross mass. Record the value thus obtained as the net mass. Determine the length and width of the roll in accordance with the procedure given in 2 and 3, and calculate the mass per unit area in grams per square metre to the nearest 5 g/m².

4.1.3 Expression of Results — The net mass should be expressed in kilograms to the nearest 0.10 kg. The mass per unit area should be expressed in grams per square metre to the nearest 5 g/m².

4.2 Determination of the Mass Per Unit Area of a Sample

4.2.1 Test Piece — The test piece shall be square, rectangular or circular in form, and have an area of $10\,000 \pm 100$ mm².

4.2.2 Procedure

4.2.2.1 Cut from the sample three test pieces, one from the centre, and the other two symmetrical with the first, in such a manner that their external edge is between 50 and 150 mm from the selvedge of the sample taken along a line which makes an angle of 45° with the length of the roll. Designate these test pieces *A*, *B* and *C* respectively.

4.2.2.2 Conditioning — Condition the test pieces at $27 \pm 2^\circ\text{C}$ and 65 ± 5 percent relative humidity for 48 hours prior to testing. Subject

to agreement between the purchaser and the supplier, the conditioning time may be curtailed to 24 hours. For all test purposes, the minimum time between vulcanization or curing and testing shall be 16 hours. Whenever possible, the time between vulcanization or curing and testing should not exceed three months. In other cases, tests shall be made within two months of the date of receipt by the customer of the product.

4.2.2.3 Weigh the test pieces to the nearest 0.005 g, and calculate the mass per unit area in grams per square metre.

4.2.3 Expression of Results — The mass per unit area should be expressed as the average of the calculated values in grams per square metre, adjusted to nearest 5 g/in².

NOTE — The procedure given in 4.2.2 is intended for use when a small sample is sent to the laboratory for test. The result is considered applicable to the sample but not to the piece or lot of goods from which the sample was taken, unless the number of samples and methods are agreed by those concerned. If this is done, each sample should be tested in accordance with the procedure given in 4.2.2 and the results averaged to obtain the average mass per unit area in grams per square metre

4.3 Determination of the Mass Per Unit Area of the Base Fabric

4.3.1 Apparatus

4.3.1.1 Balance — accurate to 0.005 g.

4.3.1.2 Flask — 500 ml capacity, fitted with a reflux condenser.

4.3.1.3 Water-bath

4.3.1.4 Oven — with natural air circulation.

4.3.2 Test Piece — The test piece shall be a square or rectangle, having an area of 10 000 ± 100 mm².

4.3.3 Procedure

4.3.3.1 Cut from the sample three test pieces, one from the centre, and the other two, symmetrical with the first, in such a manner that their external edge is between 50 and 150 mm from the selvedge of the sample taken along a line which makes an angle of 45° with the length of the roll. Designate these test pieces, *A*, *B* and *C* respectively. Immerse each test piece separately in 150 ml of an appropriate solvent or swelling agent. Decant and remove where possible the bulk of the coating from the base fabric. In case extraction is not sufficient, refluxing for 30 minutes may be done. Immerse again for 30 minutes, using fresh solvent, and decant. Thereafter, immerse the fabric and any loose threads in 150 ml of solvent, with occasional agitation for 30 minutes at room temperature. Remove the stripped test pieces, together with any loose threads, from the solvent

and wash them in 100 ml of acetone. Dry the test pieces for one hour at a temperature of approximately 100°C.

4.3.3.2 Condition the stripped test pieces for 24 hours at $27 \pm 2^\circ\text{C}$ and 65 ± 5 percent relative humidity, and weigh to the nearest 0.005 g.

4.3.3.3 Wash the stripped test pieces with a further quantity of the appropriate solvent in the manner indicated, wash in acetone, dry and condition and weigh them, as before. If the second weighing differs from the first by more than 1 percent, repeat the solvent treatment until the difference is less than 1 percent. Use the final mass for calculating the mass per unit area of the fabric.

4.3.4 Expression of Results — The mass per unit area of the fabric shall be expressed as the mean value obtained from the three results in grams per square metre to the nearest 5 g/m².

NOTE 1 — The method is not valid for fabrics which are soluble in the solvent used for the test.

NOTE 2 — The mass of the fabric after removing the coating may be different from that of the original fabric.

4.4 Determination of the Mass Per Unit Area of the Coating

4.4.1 Procedure — It is expedient to consider the mass per unit area of the coating as the difference between the mass per unit area of the coated fabric and the mass per unit area of the base fabric. From the mass per unit area of the coated fabric (determined according to 4.2) subtract the mass per unit area of the base fabric for the corresponding test piece (determined according to 4.3).

4.4.2 Expression of Results — The mass per unit area of the coating shall be expressed in grams per square metre as the mean of the three values found in accordance with the procedure given in 4.4.1.

5. DETERMINATION OF THICKNESS

5.1 Apparatus

5.1.1 Gauge — The gauge shall be of dead weight type, equipped with a dial graduated to read directly to 0.02 mm. The presser foot should be circular having a diameter of 9.5 ± 0.02 mm or 50 ± 0.05 mm. The presser foot and connected moving parts shall be loaded to give the pressure according to the category of articles being measured. The presser foot and anvil surfaces shall be plane to within 0.002 mm, and parallel to one another to within 0.002 mm. The gauge shall be calibrated for the actual load exerted by the presser foot by means of any device so arranged to measure the total force exerted by the presser foot at the several gauge readings or presser foot levels selected for

calibration. The presser foot shall be brought to each calibration level from a higher one:

	<i>Pressure</i>
a) Ordinary articles	24 kN/m ² *
b) Articles sensitive to pressure	10 kN/m ² *

5.2 Procedure

5.2.1 Measure the thickness on an oblique line drawn at an angle of 45° to the length of the roll preferably at a distance of about 1 m from the end of the roll. On this line, make five evenly distributed measurements, the first being taken at a position between 50 and 150 mm from the selvage.

5.2.2 Place the coated fabric on the anvil of the gauge, smoothen it but without tension. Lower the presser foot into the material (without impact), allow it to rest for 10 seconds, and observe and record the reading of the dial.

5.3 Expression of Results — Express the results in millimetres. The mean linear thickness in millimetres is the arithmetic mean of the five measured values on the same oblique line.

*1 kgf/cm² = 98.07 kN/m².

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Panel for Physical Methods of Test for Treated Fabrics,
PCDC 16 : 6 : 1

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ON

TREATED FABRICS

IS:

- 1001-1956 Fuel pump diaphragm fabrics: (a) synthetic rubber proofed (b) varnish proofed
- 1259-1977 Vinyl coated fabrics (*second revision*)
- 1421-1964 Cellulose nitrate coated fabrics (*revised*)
- 2037-1962 Tracing cloth
- 2089-1977 Common proofed canvas/duck and paulins (tarpaulins) (*second revision*)
- 2244-1972 Glossary of terms relating to treated fabrics (*first revision*)
- 2789-1972 Special proofed paulins (tarpaulins) (*first revision*)
- 3322-1965 PVC-coated fabrics for foul weather clothing
- 3768-1966 PVC-ventilation tubing (flexible ducting)
- 4355-1977 Fire resistant brattice cloth (*first revision*)
- 4501-1967 Aprons, rubberized, acid and alkali resistant
- 4810-1968 Fumigation sheets and covers, rubberized
- 5915-1970 Single texture rubberized water-proof fabrics
- 6110-1971 Double-texture rubberized fabrics
- 6803-1972 Special proofed canvas and duck
- 7016 Methods of test for treated fabrics:
- (Part I)-1982 Determination of roll characteristics (*first revision*)
- (Part II)-1973 Determination of breaking strength and extension at break
- (Part III)-1973 Tear strength
- (Part IV)-1973 Resistance to damage by flexing
- (Part V)-1973 Coating adhesion
- (Part VI)-1973 Bursting strength
- (Part VII)-1973 Water proofness
- (Part VIII)-1973 Accelerated ageing
- 8698-1977 PVC fabrics for footwear fabrics
- 8699-1977 Expanded vinyl coated fabrics